



Energy Efficiency and Renewable Energy
Federal Energy Management Program

How to Buy Energy-Efficient Commercial Refrigerators and Freezers

Why Agencies Should Buy Efficient Products

- Executive Order 13123 and FAR part 23 direct agencies to purchase products in the upper 25% of energy efficiency, including all models that qualify for the EPA/DOE ENERGY STAR® product labeling program.
- Agencies that use these guidelines to buy efficient products can realize substantial operating cost savings and help prevent pollution.
- As the world's largest consumer, the federal government can help "pull" the entire U.S. market towards greater energy efficiency, while saving taxpayer dollars.

Federal Supply Source:

- General Services Administration
General Product Center
Phone (817) 978-4545
www.fss.gsa.gov

For More Information:

- DOE's Federal Energy Management Program (FEMP) Help Desk and World Wide Web site have up-to-date information on energy-efficient federal procurement, including the latest versions of these recommendations.
Phone: (800) 363-3732
www.eren.doe.gov/femp/procurement
- Environmental Protection Agency maintains a listing of ENERGY STAR® commercial refrigerators and freezers.
Phone: (888) 782-7937
www.energystar.gov/products
- North American Association of Food Equipment Manufacturers (NAFEM) is a trade organization that maintains a web site with links to many companies that make and sell commercial refrigerators and freezers:
Phone: (312) 245-1054
www.nafem.org
- The Food Service Technology Center (FSTC) has several fact sheets and other publications on commercial refrigerators.
(925) 866-2844
www.fishnick.com
- American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) publishes *Standard Test Method 117-1992 Method of Testing Closed Refrigerators*.
Phone: (800) 527-4723
www.ashrae.org
- Lawrence Berkeley National Laboratory provided supporting analysis for this recommendation.
Phone: (202) 646-7950

Efficiency Recommendation^a

Product Type	Recommended ^b	Recommended ^c (24.0 cu.ft.)	Best Available (24.0 cu.ft.)
Refrigerator	0.10V + 2.04 kWh/day or less	4.44 kWh/day	3.97 kWh/day
Refrigerator-Freezer	0.27AV - 0.71 kWh/day or less	7.81 kWh/day	5.86 kWh/day
Freezer	0.40V + 1.38 kWh/day or less	10.98 kWh/day	6.79 kWh/day
Ice Cream Freezer	0.39V + 0.82 kWh/day or less	10.18 kWh/day	n/a ^d

a) This recommendation only covers solid-door, reach-in commercial refrigerators and freezers.

b) Based on ASHRAE *Standard Test Method 117-1992 Method of Testing Closed Refrigerators*. Use the formula above to calculate the recommended daily energy consumption. "V" represents the volume of a commercial refrigerator in cubic feet. For dual temp models, "AV" represents the adjusted volume, which is the refrigerator volume plus 1.63 multiplied by the freezer volume in cubic feet.

c) Best available energy use will vary for other sizes of commercial refrigerators and freezers.

d) Data currently not available for models exceeding the recommended level for a 24 cu. ft. commercial refrigerator.

The federal supply source for commercial refrigerators and freezers is the General Services Administration (GSA), which can be purchased through GSA's Schedule 539. The North American Association of Food Equipment Manufacturers (NAFEM) also provides guidance on commercial refrigerators and freezers (see "For More Information").

When buying a commercial solid door refrigerator or freezer choose a model that meets or exceeds ENERGY STAR® (see "For More Information"), all of which meet this recommendation. If a product is not labeled ENERGY STAR®, use the formula from the table to determine if it meets the efficiency recommendation. Because commercial solid door refrigerators are not subject to

Where to Find



How to Select

federal appliance standards, they do not have Federal Trade Commission “EnergyGuide” labels identifying estimated energy usage and cost. Therefore, it will be necessary to obtain the daily energy use in kilowatt-hours (kWh/day) from the manufacturer. If the daily energy use of the product is less than or equal to the value calculated using the formula found in the table above, then it meets this efficiency recommendation.

Commercial refrigerators are designed to maintain an interior cabinet temperature between 36 and 40 °F while freezers maintain temperatures between -2 and 2° F. Sizes range from small under-counter (< 12 cu. ft.) products to large (> 100 cu. ft.) roll-through units. Larger products are typically divided into smaller compartments each with its own door. Dual temperature products are available with both refrigerator and freezer compartments, much like residential refrigerators. Unlike residential refrigerators, dual temp products have separate compressors, condensers and evaporators for the refrigerator and freezer compartments. DOE’s national appliance standard for residential refrigerators has helped to create a market of more energy efficient products that use much less energy than commercial refrigerators. When considering small dual temp refrigerators, buyers can achieve additional savings by purchasing residential refrigerators. Check with your local building code or health department to see if residential refrigerators can be used in commercial applications. Ice cream freezers, also known as low temperature freezers, maintain interior cabinet temperatures at -5° F or less.

Select a refrigerator that is the appropriate size for its intended use. Oversized refrigerators will increase the initial cost and lead to excessive expense due to energy losses. Maintain the interior temperature at the proper setting for storing food products. Many commercial refrigerators are equipped with an externally mounted, digital thermometer which makes checking the internal temperature easy. Make sure that door gaskets and auto closers are maintained in good operating condition. Worn door gaskets and faulty auto closers allow warm air to enter the cabinet increases energy consumption and can lead to food spoilage.

Technology Options

Sizing and Maintenance Tips

Cost-Effectiveness Example (Reach-In, Solid Door Refrigerator, 24.0 cu. ft.)

Performance	Base Model	Recommended	Best Available
Daily Energy Use	5.2 kWh	4.4 kWh	3.1 kWh
Annual Energy Use	1,891 kWh	1,621 kWh	1,132 kWh
Annual Energy Cost	\$113	\$97	\$70
Lifetime Energy Cost	\$890	\$760	\$530
Lifetime Energy Cost Savings	-	\$130	\$360

Using the Cost-Effectiveness Table

In the example shown above, purchasing a 24.0 cu.ft. commercial refrigerator having a daily energy use at the Recommended level of 4.4 kWh is cost-effective if its purchase price is no more than \$130 above the price of the Base Model. The Best Available model having a daily energy use of 3.1 kWh is cost-effective if its price is no more than \$360 above the price of the Base Model.

What if my Electricity Price is different?

To calculate Lifetime Energy Cost Savings for a different electricity price, multiply the savings in the above table by this ratio: $\left(\frac{\text{Your price in } \$/\text{kWh}}{6.0 \text{ } \$/\text{kWh}} \right)$.

Assumptions

The example shown assumes a commercial refrigerator will operate 24 hours per day, 365 days per year and that the electricity price is 6¢/kWh, the federal average electricity price (including demand charges) in the U.S.

Lifetime Energy Cost is the sum of the discounted (present) value of annual energy costs based on continuous usage and an assumed life of ten years. Future electricity price trends and a discount rate of 3.2% are based on federal guidelines (effective from April, 2002 to March, 2003).

Metric Conversions

1 therm = 100,000 Btu
 = 29.3 kWh
 = 105.5 MJ
 $^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$
 1 cubic foot = 28.3 liters

